Best Practices Seminar
Fire Services

David Ammons
Dale Roenigk

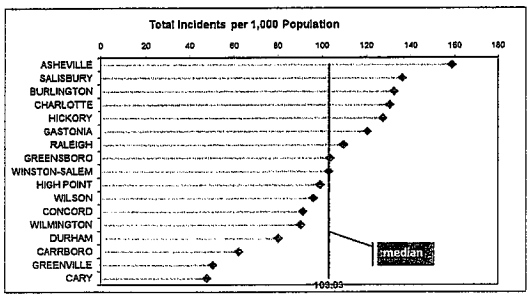
November 1, 2010

UNC SCHOOL OF GOVERNMENT

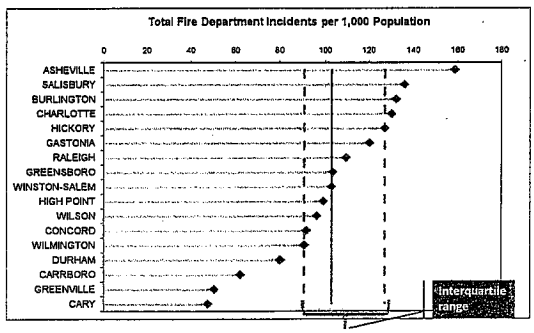
A few terms we will use today

- **Median** (the middle)
- **Interquartile range** (the middle half)
- **Scatterplot** (two variables graphed against each other)
- **Regression line** (a line which best fits the points in a scatterplot)
- **Correlation** (+1.0 is the strongest positive relationship, 0.0 is no relationship, and -1.0 is the strongest negative relationship)

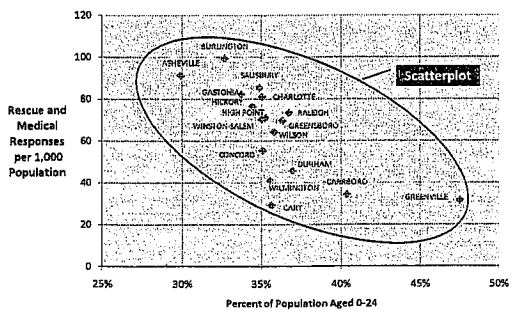
The **median** (in red) is the exact middle of the data, half are above and half are below.



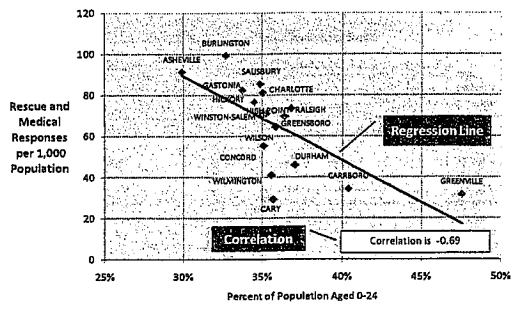
The **interquartile range** is the middle half of the data (25th to 75th percentile).



Scatterplots, regression lines, and correlations are ways to look for relationships among two data items.



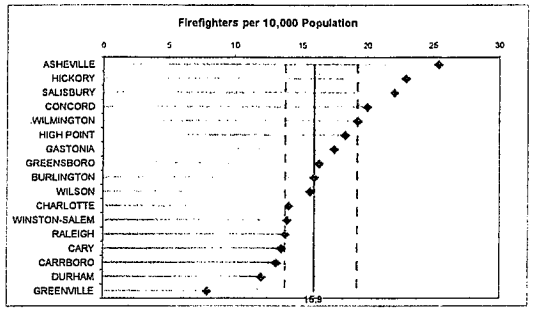
Scatterplots, regression lines, and correlations are ways to look for relationships among two data items.



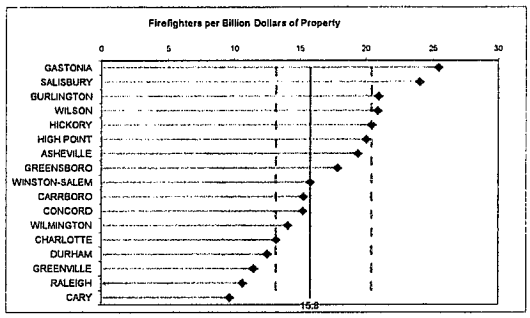
Fire Services Resources

Staffing

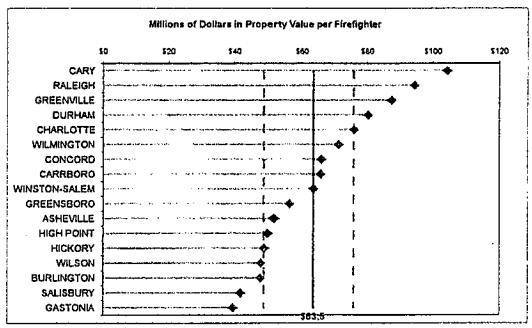
Most of our cities have 12 to 20 firefighters per 10,000 population.



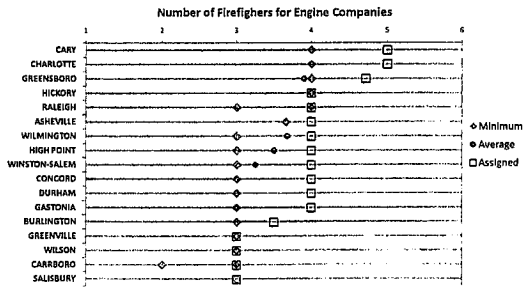
There are roughly 16 firefighters for each $1 billion in property value.



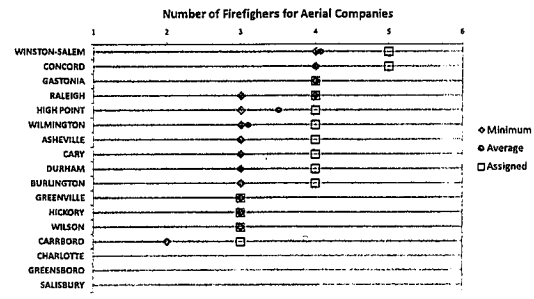
There is approximately $64 million in property value per firefighter.



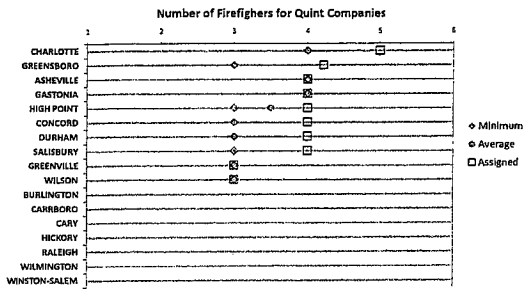
About one third of the cities report staffing for engine companies at the NFPA 1710 standard of 4 firefighters.



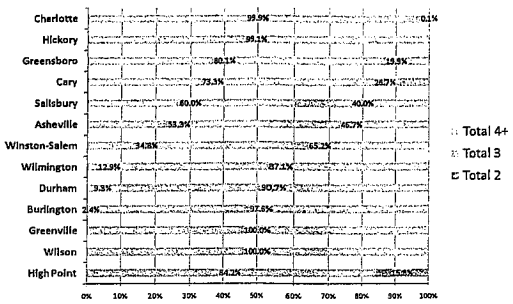
About one-third of the cities report staffing on aerial companies of 4 firefighters.



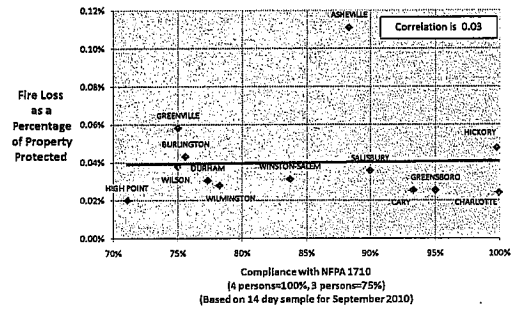
About one-third of the cities report staffing on quint companies of 4 firefighters.



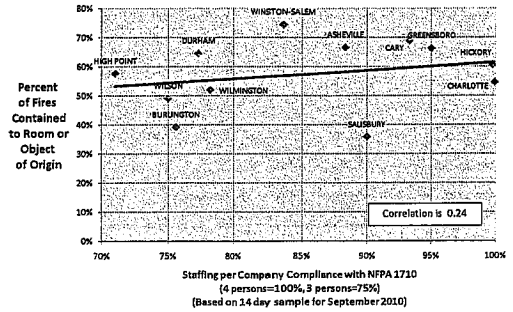
Based on the *special survey*, two of the cities are mostly compliant with NFPA 1710 at present.



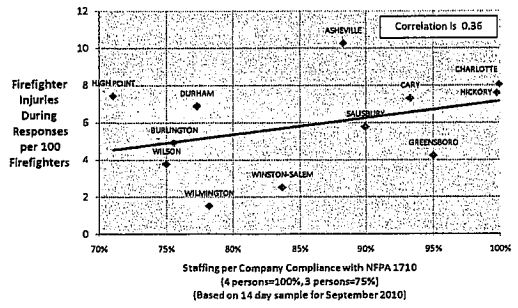
Company staffing compliance with NFPA 1710 does not yield lower fire loss.



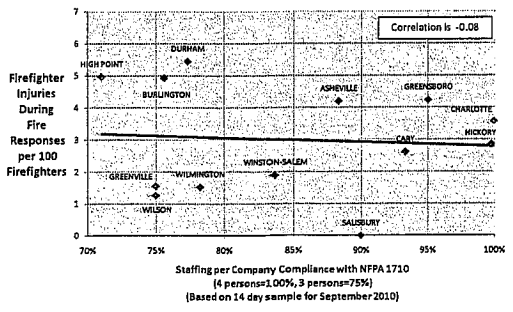
Company staffing compliance with NFPA 1710 does tend to yield slightly better containment of fires.



Company staffing compliance with NFPA 1710 is slightly correlated with higher firefighter injury rates for injuries during all responses.



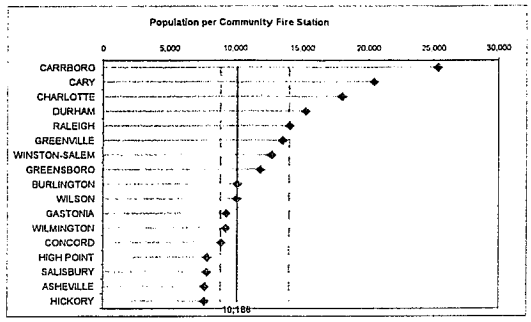
Company staffing compliance with NFPA 1710 is not correlated with firefighter injury rates for injuries during fire responses.



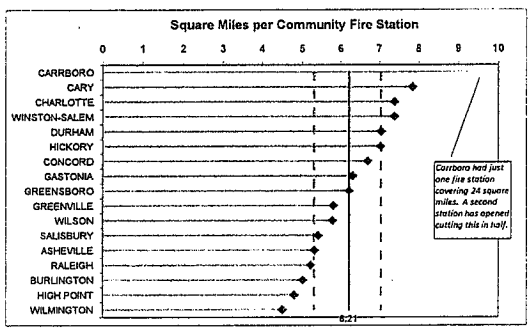
Fire Services Resources

Stations

Half the cities have 9,000 to 14,000 people per community fire station.



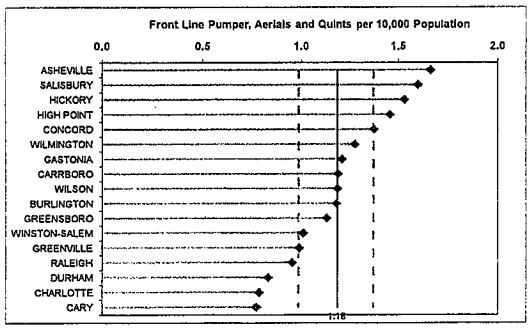
Most community fire stations average a coverage area of 5-7 square miles.



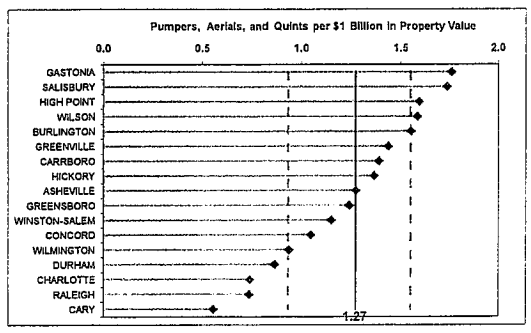
Fire Services Resources

Equipment

Most cities have between 1 and 1 ½ front line trucks per 10,000 population.



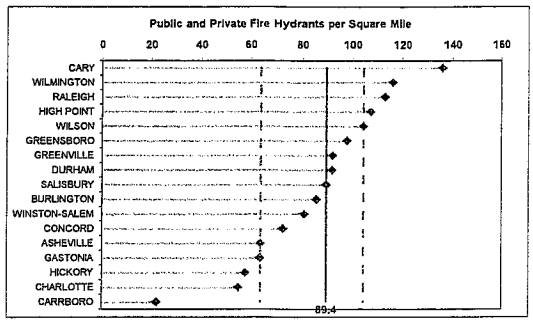
Most cities have between 1 and 1 ½ front line trucks per $1 billion in property value.



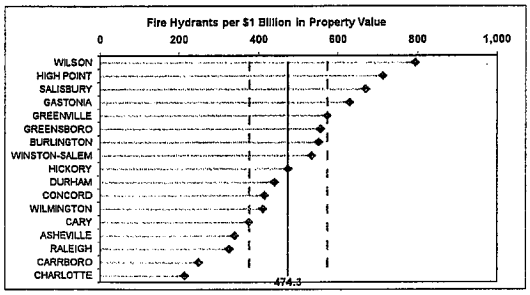
Fire Services Resources

Hydrants

The median number of public and private fire hydrants is 90 per square mile.

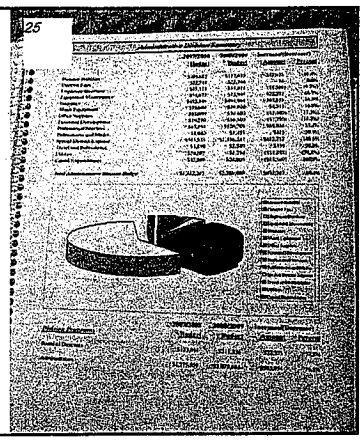


Most cities have between 300 and 600 fire hydrants for each billion dollars in property value.

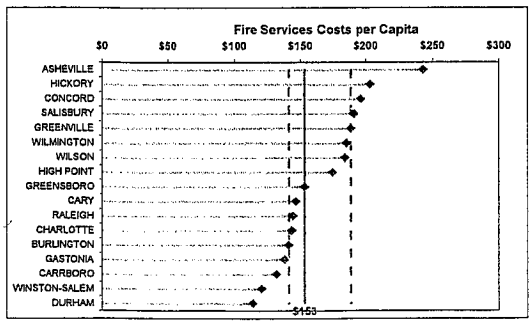


Fire Services Resources

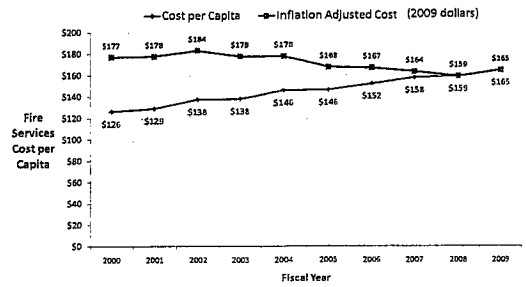
Expenditures



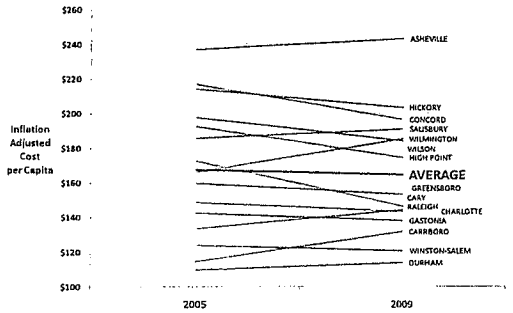
Most cities' total fire services costs run between $130 and $200 per capita.



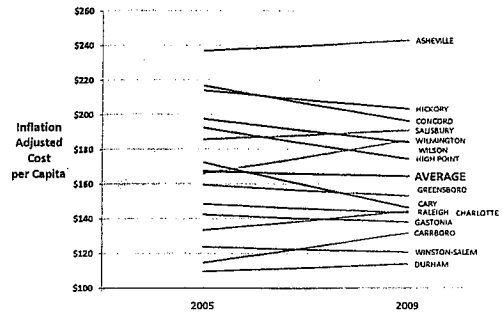
While fire services expenditures have been rising, when adjusted for inflation, costs per capita have declined over the last decade.



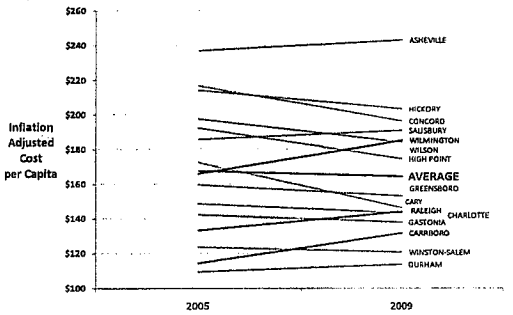
The inflation adjusted cost per capita change in the last four years has varied by city.



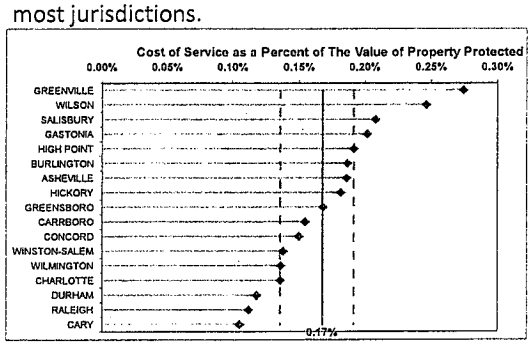
Five cities have had inflation adjusted costs per capita that have declined by $10 or more in the last four years.



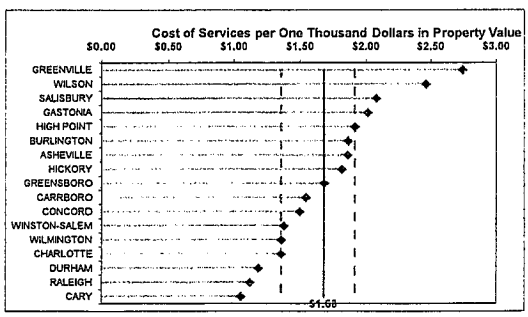
Three cities have had inflation adjusted costs per capita rise by $10 or more per capita over the last four years.



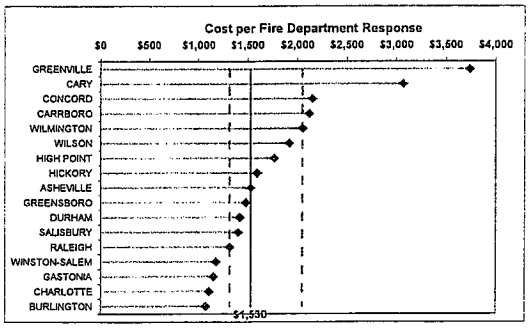
The total cost of fire services represents about 0.13% to 0.20% of the total value of property in most jurisdictions.



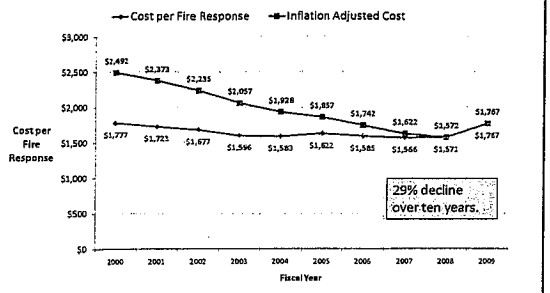
The total cost of fire services mostly ranges between $1.30 to $2.00 per thousand dollars of property value.



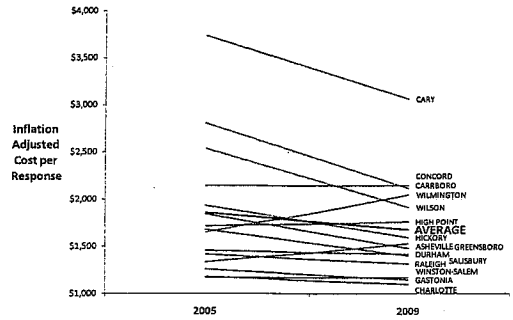
Fire services cost relative to number of responses centers around $1500 per response.



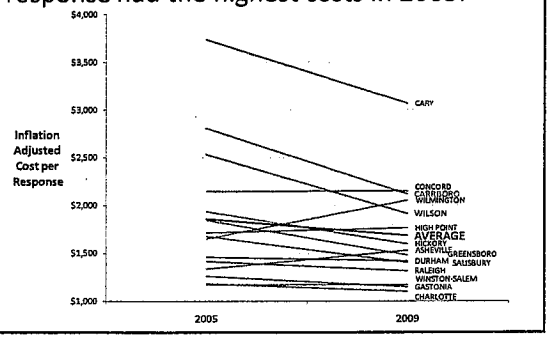
Fire services costs when adjusted for the number of responses and inflation have been declining noticeably over the last decade.



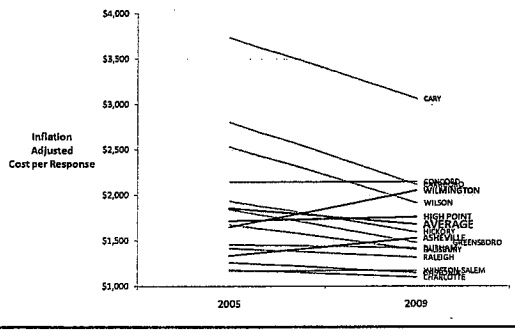
Inflation adjusted costs per response have generally gone down over the last four years.



The cities experiencing the sharpest decreases in inflation adjusted costs per response had the highest costs in 2005.



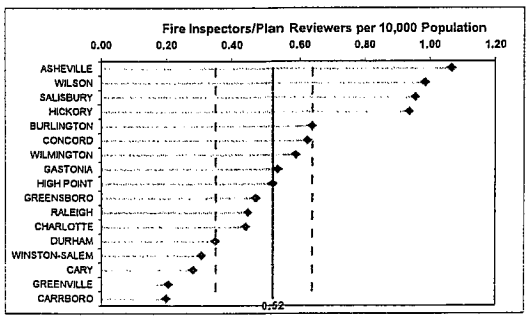
Only three cities showed more than 1 percent increases in inflation adjusted costs per response.



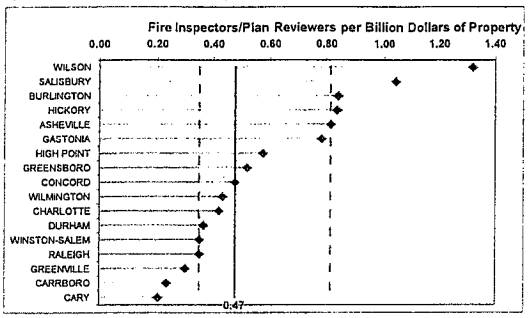
Fire Services

Inspections, Plan Reviews, Violations, and Complaints

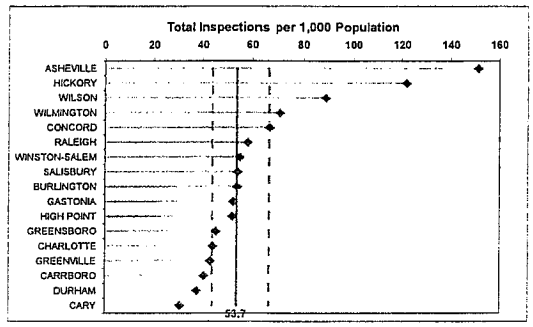
Reported number of inspectors and plan reviewers varies across the cities.



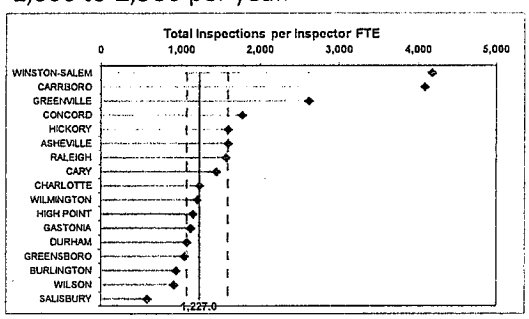
Fire Inspectors and Plan Reviewers varies substantially relative to the amount of protected property.



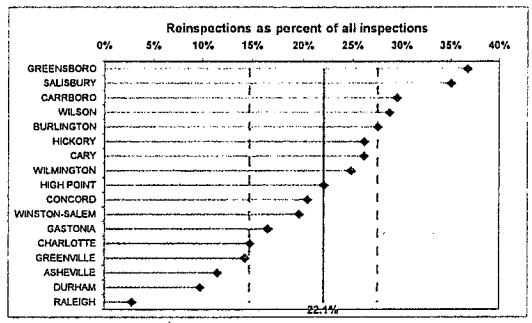
Most jurisdictions are performing 40 to 70 inspections per 1,000 people.



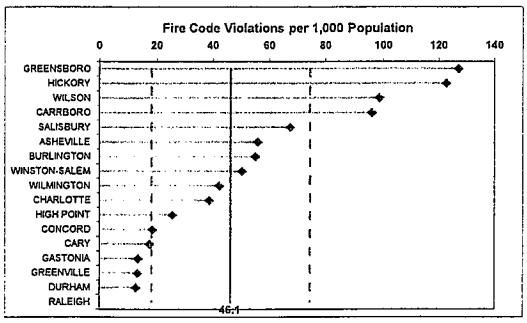
Number of fire inspections completed per fire inspector is mostly in the range of 1,000 to 1,500 per year.



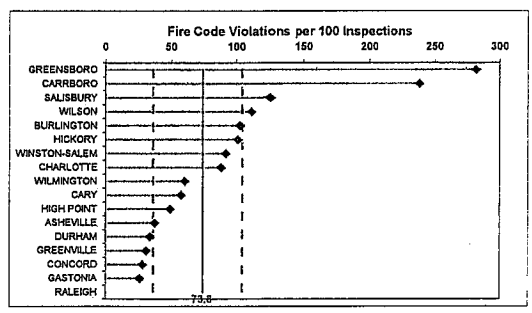
The amount of reported reinspections varies significantly across the jurisdictions.



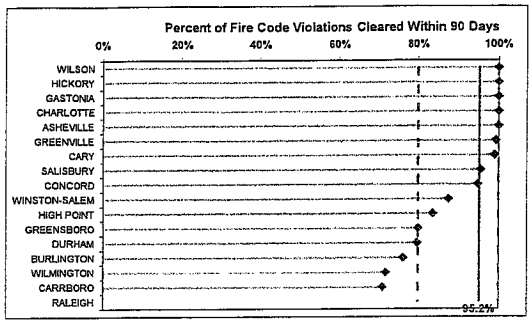
Reported fire code violations varies significantly across the jurisdictions.



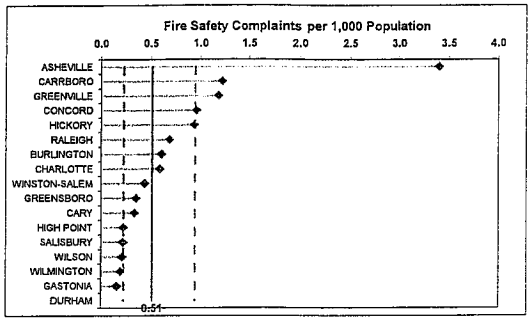
The number of reported fire code violations relative to the number of inspections averages ranges widely.



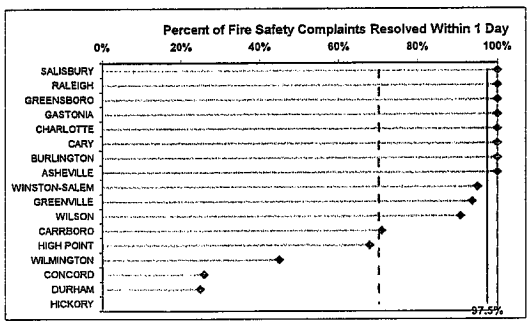
In most of the cities 80% or more of the fire code violations are cleared within 90 days.



Reported fire safety complaints mostly range between 0.2 to 1.0 per 1,000 people.

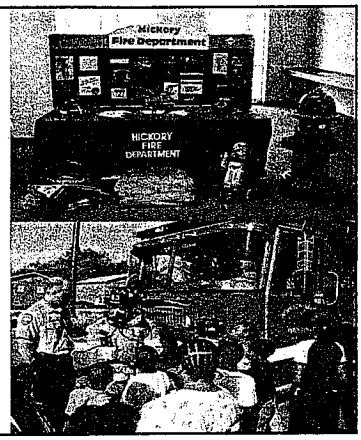


Reported resolution of fire safety complaints within one day is mostly high.

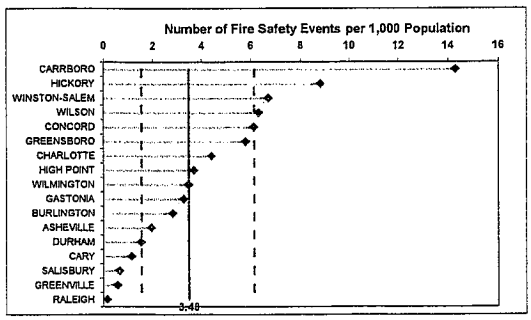


Fire Services

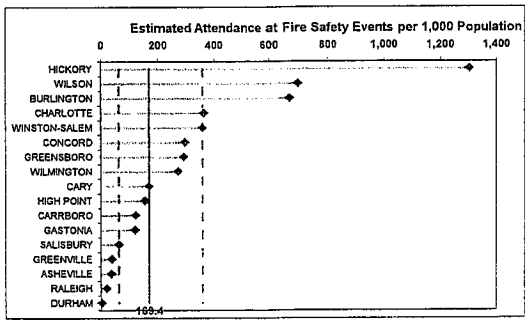
Fire Education



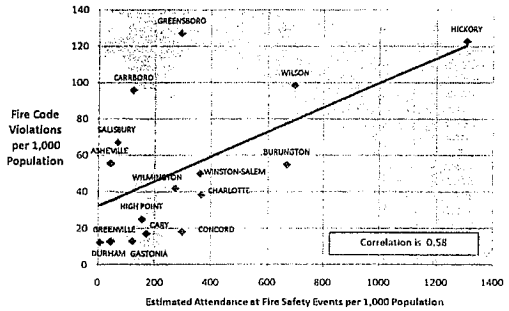
The number of fire safety education events varies across the cities.



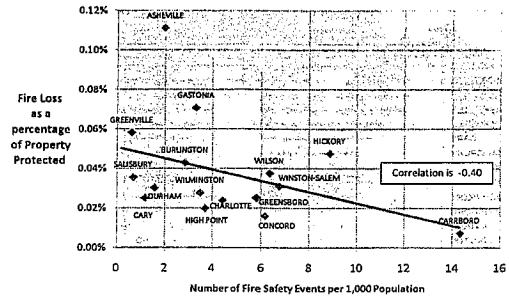
Estimated attendance at fire safety events varies widely across the cities.



Communities doing more fire education also issue more fire code violations.

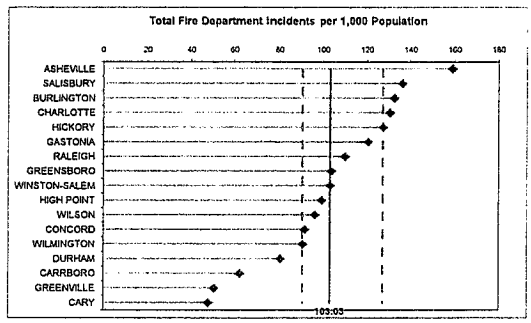


Communities with more fire education events had somewhat lower reported fire losses in FY 2009.

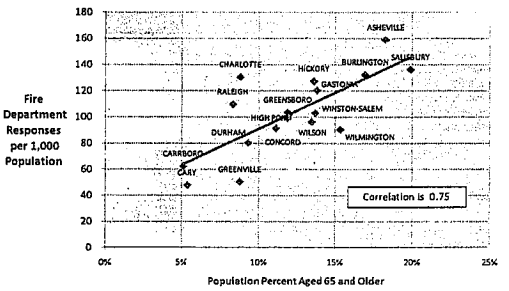


Fire Services Responses

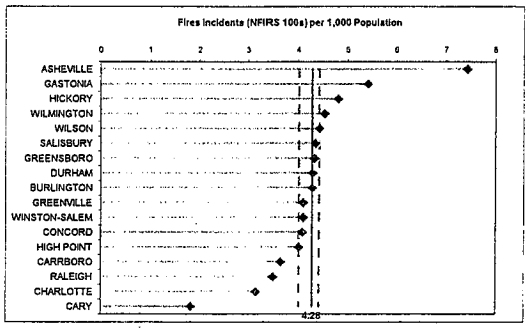
Total incidents relative to population varies widely across cities.



Communities with more elderly have higher overall response rates. True for medical and fire calls.



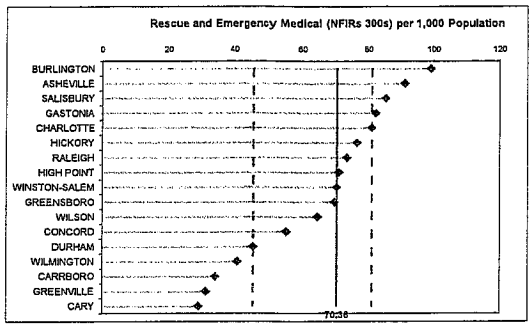
Fire Incidents are mostly clustered around 4.3 fires per 1,000 population



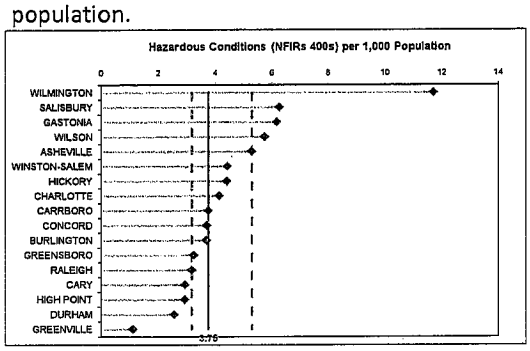
Fire Services

Responses: Medical and Rescue Calls

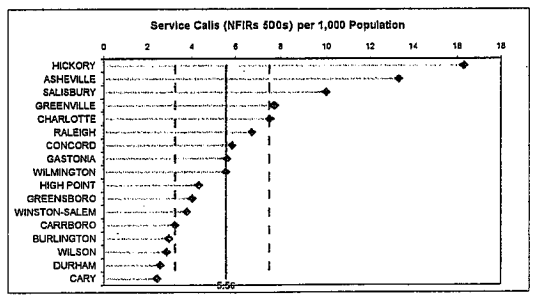
Medical and rescue calls vary widely across the cities.



Hazardous condition incidents are mostly concentrated between 3 and 5 calls per 1,000 population.

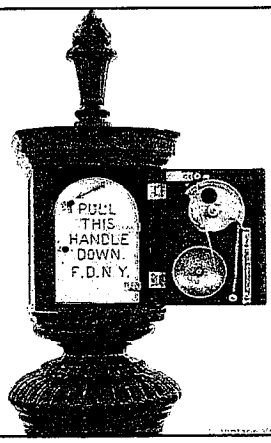


Service calls vary widely among the benchmarking cities.

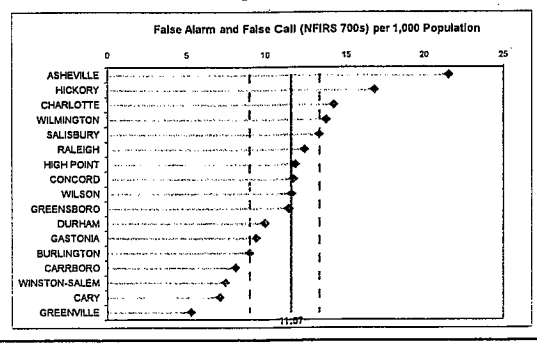


Fire Services

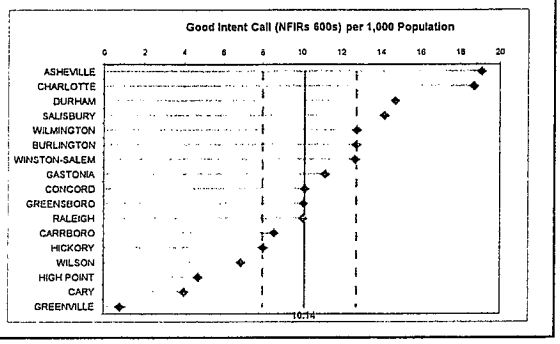
Responses: False Alarms & Good Intent



False alarms vary substantially across the benchmarking cities.

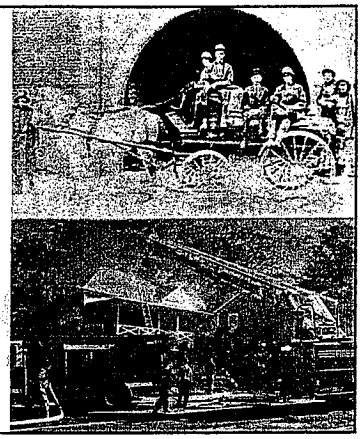


Good intent calls vary significantly across the benchmarking cities.

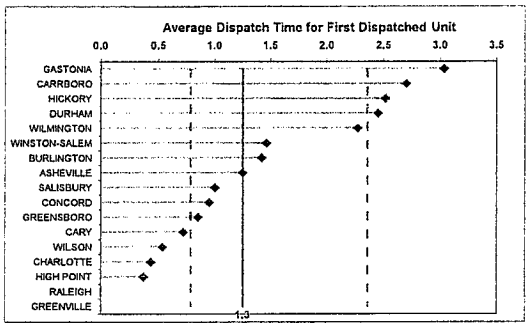


Fire Services

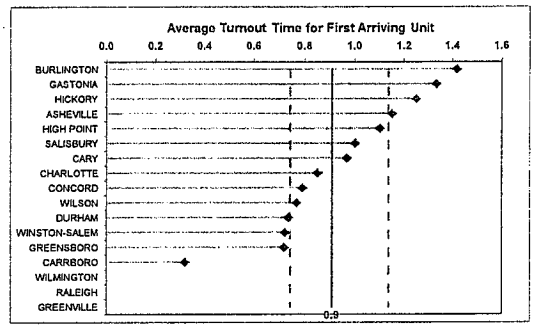
Response Times



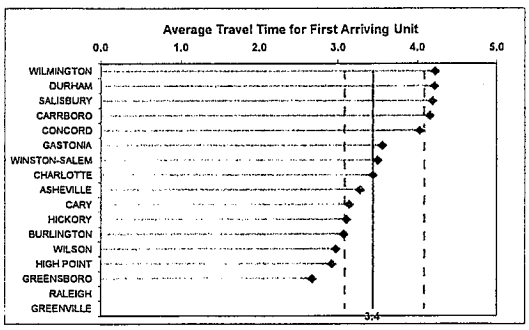
Average dispatch time varies widely across the jurisdictions.



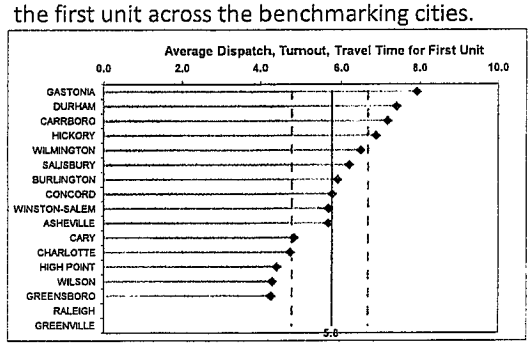
Average turnout time was generally was just under one minute for the cities.



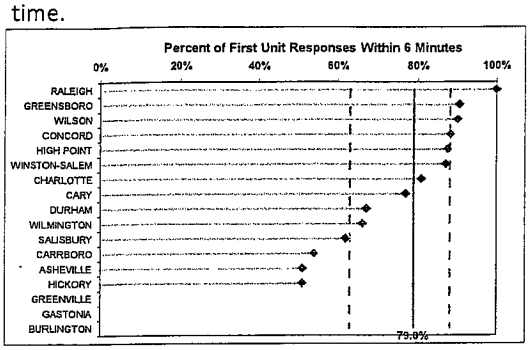
Average travel time for the first arriving unit was generally between three and 4 minutes.



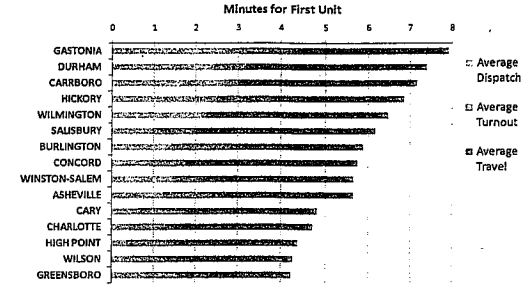
Average combined time of dispatch, turnout, and travel mostly ranged from 5 to 7 minutes for the first unit across the benchmarking cities.



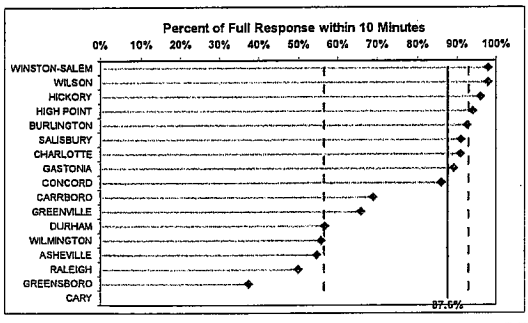
Half of the jurisdictions had the first unit respond within six minutes 80% or more of the time.



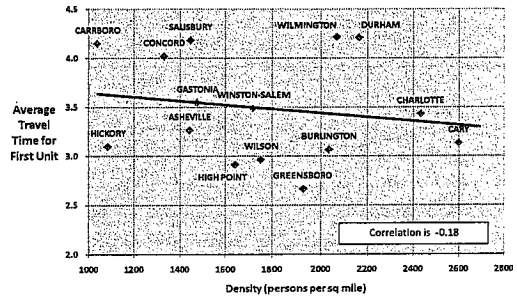
Total response time for the first arriving unit is affected differently across the benchmarking cities by dispatch, turnout, and travel.



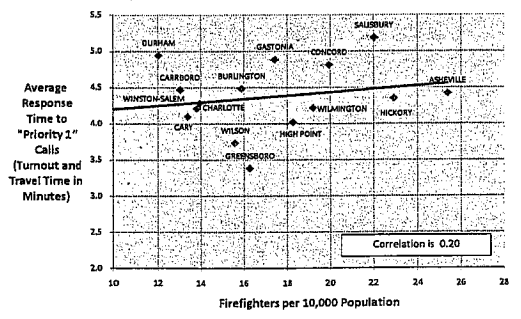
Seven of the benchmarking cities reported that 90% or more of their calls were within ten minutes for full response.



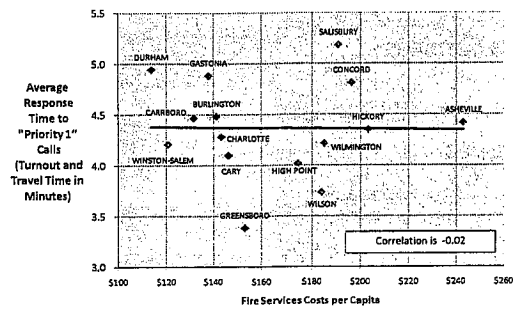
Travel time for the first arriving unit is not strongly correlated with density.



More firefighters per capita is not strongly associated with response times.

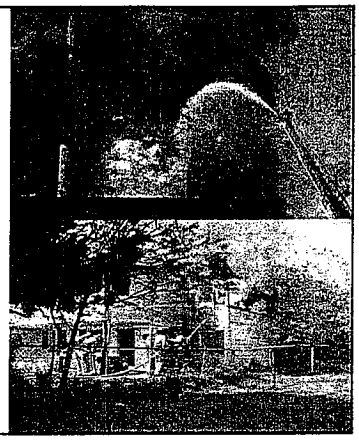


Fire services cost per capita is not related to response time.

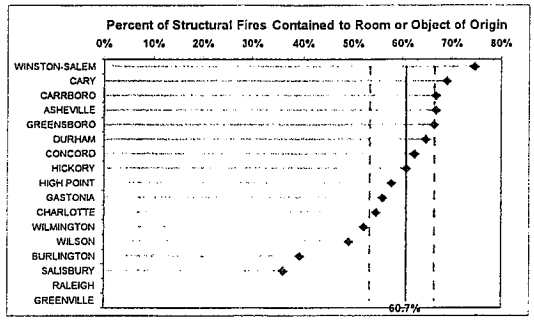


Fire Services

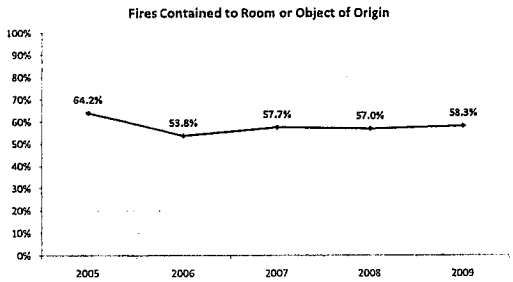
Containment of Fires



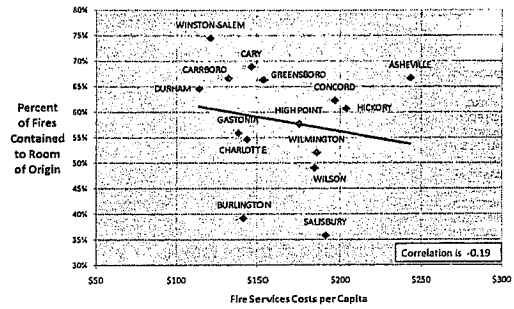
About 3 out of 5 structural fires are contained to the room or object of origin.



The containment of fires to room or object of origin has been fairly stable over the last five years.



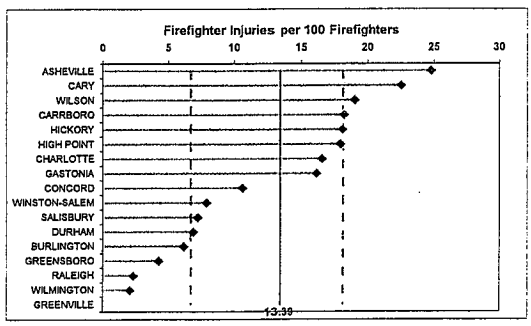
Containment of fires is not strongly related to fire expenditures per capita.



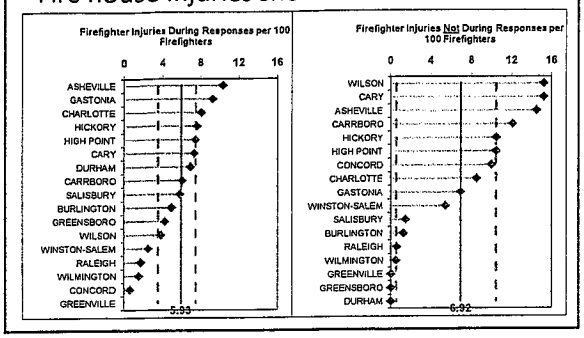
Fire Services

Injuries

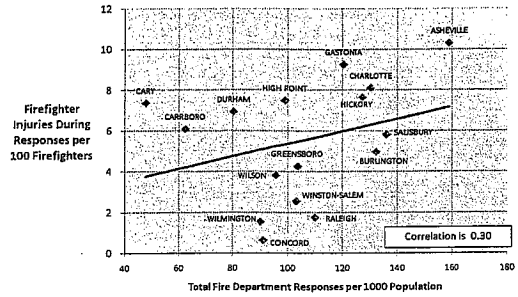
Reported firefighter injuries varied widely across the cities.



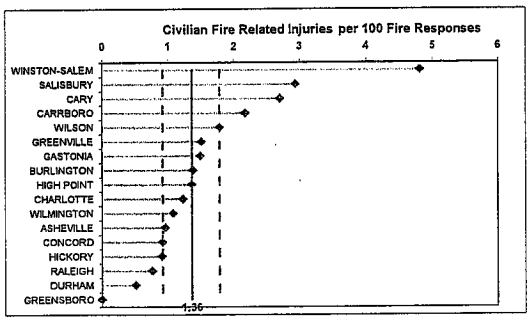
Where fighter injuries are occurring (during response or not) varies across jurisdictions. Fire house injuries show more variation.



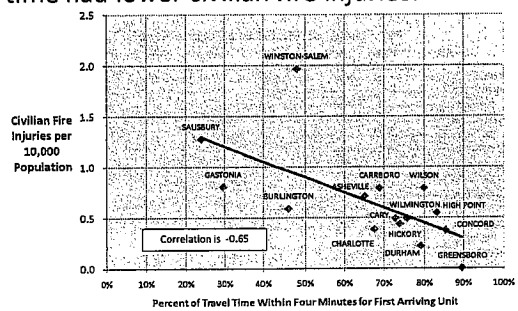
The number of firefighter injuries during responses is positively related to the number of responses.



Most cities experience 1 to 2 civilian injuries for every 100 fire responses.

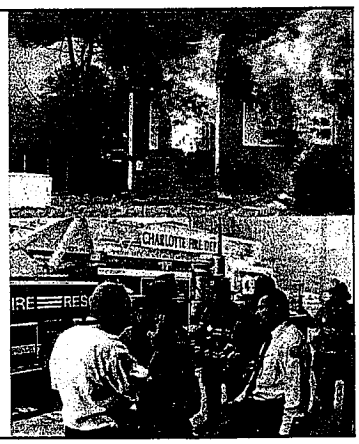


Communities where the first responders arrived more often within 4 minutes travel time had lower civilian fire injuries.

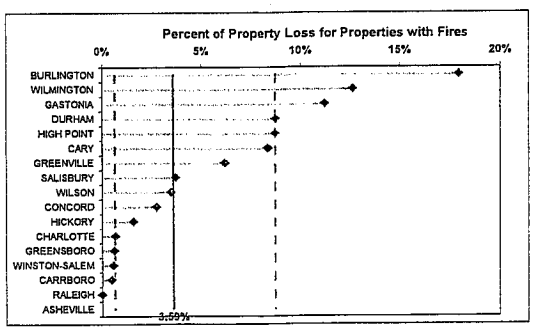


Fire Services

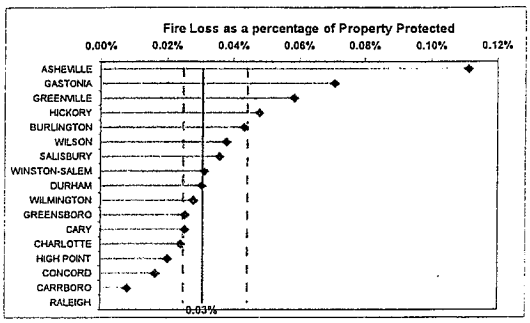
Fire Loss



For properties with fires, the average amount of fire loss varied across the cities.

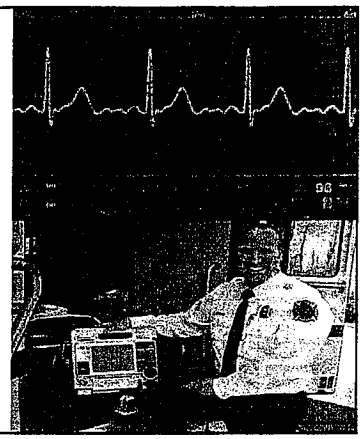


Fire loss as a percentage of total property protected varied widely.

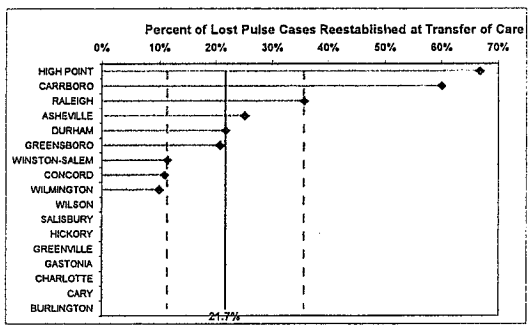


Fire Services

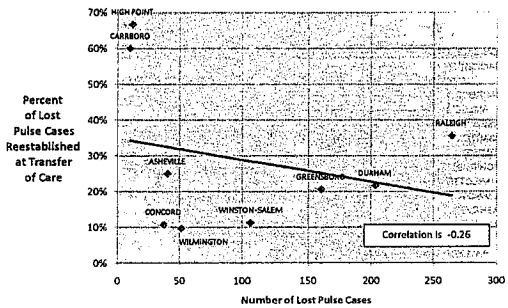
Lost Pulse Cases



The average percent of lost pulse cases where pulse was reestablished at transfer of care was 22%.



Communities with high "save" rates had fewer cases.



North Carolina Benchmarking Project

For further information contact:

Dale Roenigk
Benchmarking Director
UNC School of Government
roenigk@sog.unc.edu
919-843-8927

North Carolina Benchmarking Project
UNC School of Government